

## ENERGY SECTOR in ARMENIA

The Republic of Armenia has adopted a policy of sustainable economic development, which assumes harmonized growth for each branch of the economy. Under these conditions, the energy sector is the most important sector for growth of the society as its qualitative and quantitative development determines the degree of Armenia's level of development and wellbeing of its citizens.

Armenia can meet only 35% of the total demand for energy with its domestic resources, thus it is highly dependent on imported energy resources. In addition, energy efficiency within the Armenian economy is much lower than that of developed countries. Therefore, in order to secure the sustainable development of Armenia, priority must be given to the development of domestic energy resources and widespread implementation of energy efficiency throughout the economy.

Armenia has practically no oil or natural gas reserves, and imports nearly all its energy (oil and oil products from the Russian Federation, Georgia, Iran; gas from Russia and Iran, and nuclear fuel from Russia). Naturally, this represents a huge import bill (more than 15% of total imports).

The country's electrical system had been designed in Soviet times to serve a regional Trans-Caucasus grid, and not as an independent system. As such, generation plants were built to run on imported fuels.

However, much of the above installed capacity is old, and requires modernization or replacement. 38% of this capacity has been in operation for more than 30 years. The primary equipment at the thermal power plants (TPPs) has reached 200 thousand hours of use, and does not conform to internationally accepted technical and ecological criteria. 70% of the equipment at the hydro-power plants (HPPs) has been in operation for more than 30 years (50% for more than 40 years).

Electricity in Armenia is generated by:

- 1) nuclear power plant, which generates 30-50% of the electricity needs, depending on plant uptime and ability to purchase nuclear fuel. Armenia is under international pressure to decommission this plant, which is considered to be unsafe. However, the Government is reluctant to close this plant until alternate generating capacity is online, and it is scheduled to operate until at least 2016.
- 2) hydro-electric plants, which generate about 20-40% of the country's needs, depending on rainfall, which exhibits a significant variation. Power generation from the Sevan-Hrazdan Cascade has had to be reduced because this was causing a drop in water level in Lake Sevan.
- 3) thermal plants, which provide the balance, from burning natural gas.

Today, Armenia has sufficient electricity-generating capacity, but electricity demand is expected to grow at two-three percent annually overall, and demand will overtake supply when the nuclear plant is no longer functional in few years time.

Under these circumstances, the Government's strong interest in developing renewable sources of energy is natural. Renewable energy cannot completely substitute for the contributions of nuclear and thermal energy, but they can be an increasingly important component of the electricity mix. As such the Law on Renewable Energy and Energy Efficiency passed in 2004 established a legal framework to facilitate development of renewable energy resources, and specified that all renewable energy produced is to be purchased by the electricity distribution company. The regulator for the power industry, the Public Service Regulatory Committee (PSRC) has set attractive tariffs for newly constructed Small Hydro Power Plants (SHPPs), and wind and biomass plants, and has stipulated that the electricity off-take and these tariff rates will apply for 15 years from the date of issue of an operating license for a new plant.

Armenia has renewable energy resources that can already compete with conventional resources in the generation of electricity. Most of the viable projects are in Small Hydropower sub-sector. SHPPs only contribute less than 2 % of the electricity now, but could add over 250 MW (megawatts) of capacity. About 23% of the annual generation potential of SHPPs is still unrealized.

Wind Power Projects (WPPs) with total capacity of 195 MW and generation of 0.55 GWh per year have been identified. The national target for wind power is 500 MW of grid connected capacity by 2025.

Small hydropower and wind power generation options compare favorably with electricity generation alternatives.

Investment costs for WPPs are expected to decline, making them more competitive in the future.

There are a number of innovations in the field of development of new sources of energy. For example, "Ecoatom" company developed a simple method for obtaining hydrogen to be used in car engines by magnesium and water. A chemical reaction of mixing magnesium and water results in the production of hydrogen, magnesia and heat. This method is well known, but the revolutionary difference is relatively low cost of magnesium produced by a new technology.

